Saskatchewan
Agriculture, Food
and Rural
Revitalization

ADF

AGRICULTURE DEVELOPMENT FUND

FINAL REPORT

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AGRI-ARM PROGRAM

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Conservation LEARNING CENTRE

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2003 Project Summary

Canola seed size: A trial was established to determine the effect of canola seed size on maturity, yield, oil and contribution margin. Regular and large size seed of the variety **MilleniUM 03** were used. Four plots (54' x 250' each) were established for each seed size.

Characteristic	Regular seed	Large seed
Germination (%)	92	96
Seed weight (g/1000 seeds)	4.3	5.1
Plant counts (per m)	129	89
Oil (%)	43.0	43.3
Erucic acid (%)	48.9	47.8
Yield (bu/ac)	21.3	20.2
Dockage (%)	3.95	3.72
Green seed (%)	0.4	0.65
Damaged seed (%)	0.85	0.65

As expected, plots seeded with regular size seeds had more plants per metre than plots seeded with large seed, which reflects the seed weight and number of seeds per pound. Original seed size had very little effect on oil and erucic acid content. Marginal differences are seen in yield, dockage, green and damaged seed but these have not been tested statistically. *Cooperators: CanAmera Foods, Canola Council of Canada*

Flea beetle treatment: 2663 InVigor canola was treated with **Prosper**. There was no evidence of flea beetle damage and therefore, the treatment appeared to be very successful, given reports in the area of heavy beetle infestation and damage despite seed treatment. *Cooperators: Bayer, Gustafson*

Injecting swine manure: Best management practices for annual crop production (wheat) were demonstrated as a Greenhouse Gas Mitigation Project for Canadian Agriculture. The demonstration also showed the negative agronomic effects of over application of swine manure. Swine manure injection treatments were preseed 3000 (90# N), 6000 (180# N) or 9000 (270# N) gal/ac; post-emergent 3000, 6000 or 9000 gal/ac; 70#/ac commercial fertilizer; check (no fertilizer). Only 75% of the nitrogen in the manure is available in the first year.

Treatment	Crude protein (%)	Yield (bu/ac)
Preseed 3000 gal/ac (90# N/ac)	14.9	39.4
Preseed 6000 gal/ac (180# N/ac)	14.8	44.3
Preseed 9000 gal/ac (270# N/ac)	15.0	45.7
Post-emergent 3000 gal/ac	15.1	34.8
Post-emergent 6000 gal/ac	14.9	29.9
Post-emergent 9000 gal/ac	14.7	28.1
Commercial fertilizer (70# N/ac)	14.8	44.0
Check (no fertilizer)	14.7	32.9

Amount, timing of application and type of fertilizer had no impact on crude protein content of the wheat (all data was corrected to 14.5% moisture). Increased amounts of swine manure injected preseed did not have any effect on yield and increased amounts injected post-emergent had a negative effect. Yield in plots with preseed injections was similar to plots seeded with commercial granular fertilizer (46-0-0). Yields in the check and post-emergent injection plots were similar. This demonstration will be continued in 2004. In preparation, swine manure was injected into some plots in the fall of 2003. *Cooperators: Prairie Agricultural Machinery Institute, Canadian Pork Council, Roger Begrand*

Meteorological data on air temperature, relative humidity, solar radiation, brightness, leaf wetness, wind speed, precipitation and soil temperature was collected until June 19 at which time four of the sensors became nonfunctional. Air temperature, relative humidity, solar radiation and brightness data continued to be collected until November 5 and rainfall was measured manually. **Growing season rainfall: 5.86"**

Strawberry crowns (~300) were planted in the spring of 2003 into loamy soil. They were fertilized and watered (1" per week). Weeds were controlled. Despite the care, only ~12 survived to the fall. Of those, only 2 produced runners. The investigation into this lack of production continues and further tests will be completed in the spring of 2004. *Cooperator: University of Saskatchewan*

Field scale demonstrations of direct seeding / zero till management systems. Fields were direct-seeded using minimum till equipment. At this time, accurate yields and dockage are not available and yield maps not analyzed.

- **Snowbird hard white spring wheat** was seeded into canola stubble May 20 at 2 bu/ac with 85# N and 23# P. Roundup Transorb and Amitrol were applied pre-emergent, Achieve Liquid, Mextrol and Tilt in-crop, and Touchdown iQ preharvest. Growth in patches was retarded; we could not identify the cause. This negatively affected yield. Yield: ~32 bu/ac. *Cooperators: Quality Assured Seeds, Silhouette Seeds, Monsanto, Nufarm, Syngenta, Simplot*
- **AC Superb hard red spring wheat** was seeded into canola stubble May 20 at 1.75 bu/ac with 85# N and 23# P. Prepass was applied pre-emergent, Achieve Liquid, Mextrol and Tilt in-crop and Touchdown iQ preharvest. Yield: ~47 bu/ac. *Cooperators: SeCan, Silhouette Seeds, Dow AgroSciences, Syngenta, Simplot*
- **Effect of copper on yield in hard and white spring wheat.** Copper (Aqua Blue) fertilizer (3#) was added to portions of the Snowbird and Superb fields. Yield maps were created but analysis is incomplete at this time. *Cooperator: Gates Fertilizers*
- Two fields were seeded to **CDC Stratus malt barley** at 2 bu/ac: 35 acres on the CLC home base (wheat stubble) May 19 with 45# N, 23# P and 5# S and 25 acres on newly rented land (disked barley stubble) May 22 with 25#N and 28# P. Both crops were sprayed in-crop with Achieve Liquid and Prestige. The 35-acre field was sprayed with Tilt. There was a substantial difference in productivity between the two fields. Yield and grain characteristics of the barley grown on the "home" field were 70 bu/ac, 52 lb/bu and 88% plump, and those on the newly rented land were 40 bu/ac, 48 lb/bu and 86% plump. Barley from the home field was also higher in crude protein content. These differences are attributed to very heavy weed populations, a less-than-optimal seedbed and possibly the Tilt. *Cooperators: Syngenta, Dow AgroSciences, Simplot*
- **Field King Clearfield canola** *(Cooperators: Brett-Young Seeds, Prince Albert Co-op)* and **2663 InVigor canola** *(Cooperator: Bayer)* were seeded into disked barley stubble at 5.5#/ac into the newly rented land May 17–19 with 40# N, 28# P and 13# S. In addition to Odyssey and Liberty applications to the Field King and 2663 respectively, Lontrel was applied in an attempt to control a heavy Canada thistle population. Despite doing everything agronomically possible to ensure a good crop, yield was very poor (5 - 10 bu/ac) and dockage very high. A poor seedbed, heavy weed competition and a lack of moisture negatively affected these crops. Conditions did not allow for an "unbiased" showing of these varieties. *Cooperators: BASF, Simplot*

Precision agriculture in flax: Prescription-applied variable rate versus conventional blanket application of nitrogen for wet and dry season production. This is a demonstration of best management practices for soil and nutrient management under the Greenhouse Gas Mitigation Project for Canadian Agriculture.

Zone	Application	Nitrogen (lb/ac)	Phosphorus (lb/ac)	Season	Slope
1	Conventional (blanket)	20	28 lb/ac	Wet	All
2	Variable (0.5X recommended)	10	28	Wet	Lower
3	Variable (1.5X recommended)	30	28	Wet	Upper
4	Conventional (blanket)	20	13	Dry	All
5	Variable (0.5X recommended)	10	13	Dry	Upper
6	Variable (1.5X recommended)	30	13	Dry	Lower

CDC Bethune flax was seeded June 3 at 40#/ac into wheat stubble. Roundup Transorb was applied preseed, FlaxMax Ultra in-crop and Glyfos preharvest. Yield: ~15 bu/ac. Analysis of maps is incomplete at this time. *Cooperators: Saskatchewan Soil Conservation Association, Moker & Thompson Implements, Monsanto, BASF*

Winter wheat

- **CDC Osprey** winter wheat was seeded September 17, 2002 at 2 bu/ac with 13# N and 21# P. There were concerns at seeding time – the preceding canola crop had been swathed early in August, rained on (~5"), second growth was approximately two feet tall and the late date. Emergence was good but poor snow cover and lack of moisture adversely affected survival. On May 15, 2003, 40# N (liquid) was dribbled onto the field. Target and Horizon were applied in-crop and the field was preharvested with Roundup Transorb. Yield: ~21 bu/ac. *Cooperators: Ducks Unlimited, Syngenta, Simplot, Monsanto*
- **Varieties:** McClintock, Raptor, Falcon, Harrier, Bellatrix, Clare
- **Do's and don'ts** to promote good production practices: 1) Seed shallow ~1". 2) Seed on time – optimal date at CLC is August 27. Optimal stage in fall is 3-leaf. Poor harvesting led to late seeding (September 16). Seed placed at 1" depth reached 1.5-leaf stage compared to 1-leaf stage at 3" depth. 3) Seeding rate: 150#/ac looked better than 120#. 4) Fertilize with P at seeding. 5) Surface apply appropriate rate and source of N as early as possible in spring. Rates were 60 to 120# N/ac side banded at seeding or surface applied May 5 as 46-0-0 or liquid. Due to other crop stresses, there was little difference in fertility trials. *Cooperators: Saskatchewan Soil Conservation Association, Ducks Unlimited Canada*

Monitoring water quality: A long-term on-farm program has been initiated. Water samples (collected 3X a year) from 8 water bodies will be analyzed for nutrients and pesticides. Various levels of riparian protection exist: surrounded by dense nesting cover (not abutting cultivated land); within a cultivated area and surrounded by an established riparian area; within a cultivated area and surrounded by a developing riparian barrier; in fields where cultivation nears the water's edge. Due to low water levels, only 9 of a possible 24 samples were collected. Results are pending. *Cooperator: CARDS (Agriculture and Agri-Food Canada), National Hydrology Research Institute*

Containment system for fuels and liquid fertilizers: A pit was dug with the dimensions of 40' x 12' x 2' and a berm created. The bottom and sides were rotatilled and bentonite incorporated to seal the pit. Wooden forms were placed in the bottom and filled with crushed rock. Three tanks containing liquid fertilizer were placed on the rock. Total cost, including labour, was less than $1,000. Fuel tanks will be moved to the pit in the spring of 2004.

Riparian forage barriers around wetlands: In preparation for seeding, weeds were controlled throughout the growing season by mowing and applications of Roundup Transorb. The area was seeded on November 6 to a mixture of intermediate wheatgrass, smooth bromegrass and alfalfa. Fertilizer will be applied in the spring of 2004. *Cooperator: CARDS (Agriculture and Agri-Food Canada)*

Vegetation control in white spruce has been studied since 1994. Weed control methods employed are: herbicides only (directed spraying with Roundup); rototilling to within 3" of tree stems; perforated plastic blankets; jack pine wood shavings mulch (4" deep) and no weed control. Trees with no weed control are less than 2' in height or have died. Wood shavings served the initial purpose with some "weeds" (most crested wheatgrass) starting to invade. The established grass stand subsequently controls weeds. The perforated blankets are beginning to tear but have served the initial purpose. The two best methods of weed control are the herbicide and wood chip treatments. In 2002, tree height (Figure 1) and trunk diameter at four feet above the ground (Figure 2) were measured. *Cooperators: PFRA (Agriculture and Agri-Food Canada), Canadian Forest Service*

Figure 1: Tree height (m) as influenced by vegetation control

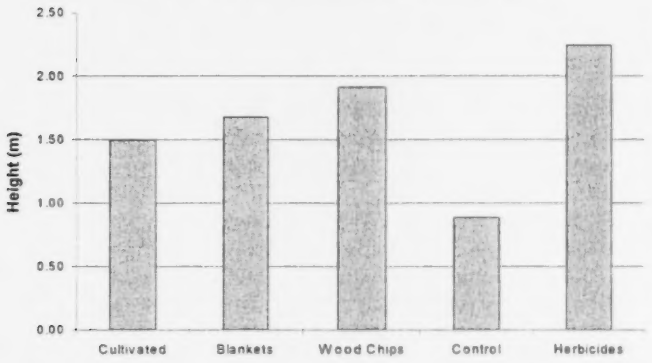
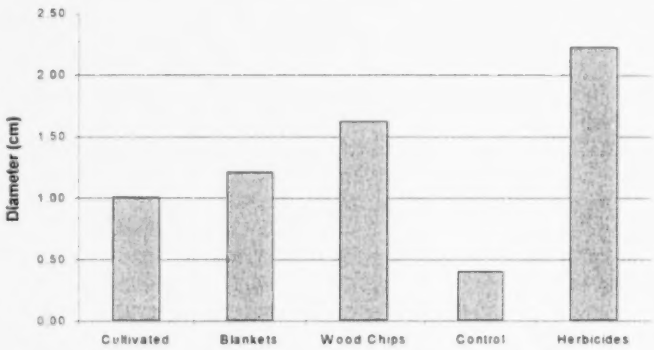


Figure 2: Tree diameter (cm) as influenced by vegetation control



Delta pea seed was treated with **Apron Max** fungicide, Tag Team peat inoculant, seeded May 14-15 at 180#/ac with 7#N and 28#P. Emergence (despite lack of moisture, poor seedbed and heavy weed competition) was good. Due to complications with the sprayer, the most of the peas were severely damaged by an unintentional application of Lontrel with the Odyssey (see following note). There were no symptoms of disease in the healthy peas (again likely due to the dry conditions) and therefore **Headline** fungicide was not applied. *Cooperators: Syngenta, BASF*

Extension:

- Field days: WTO Negotiating Team, Ministry of Agriculture; China (20) and CLC General Annual Tour "Ten Years of Progress" (120)
- Trade shows, conferences, meetings: Crop Production Show, Crop Talk, SSCA Annual Conference, Nipawin Agri-Forum, Dean's Tour (College of Agriculture), Prince Albert Farm Fair, Ag-Ed Showcase, Mosquito Control Workshop, Greencover Workshop, "Celebrating Ag Awareness", Chamber of Commerce luncheons, Provincial Council of ADD Boards Regional meetings, Saskatchewan Advisory Council on Forage Crops
- Numerous printed articles and radio interviews
- Involvement with Saskatchewan Soil Conservation Association, Agri-ARM and Agriculture in the Classroom
- The frame for a website has been developed through cooperation with SIAST students (New Media Communications). A local high school student is working to complete development of the site.

Through these activities, the CLC continues to develop and strengthen the network between producers, industry and researchers. *Cooperator: CARDS (Agriculture and Agri-Food Canada)*

School Program: Invitations were issued to 350 schools in Saskatchewan: north to Laronge, east to Tisdale and Nipawin, west to North Battleford and south to Saskatoon. **Over 1500** students (and 300 accompanying educators and parents) participated (a further 220 students booked but cancelled due to inclement weather) for a **ten-year total of 12,870 students**. This year, in addition to local schools, schools from Saskatoon, North Battleford, Sucker River, Lake Lenore and Dalmeny and teachers from Spiritwood on a "fact-finding mission" visited the CLC.

Following the trend over the past two years, there was an increase in participation from students at the junior (36%) and senior (33%) high level. The CLC hosted a Social Justice Inservice tour. A maize maze was developed and used extensively by visiting students. *Cooperators: PromoScience (Natural Sciences and Engineering Research Council), Saskatchewan Canola Development Commission, CARDS (Agriculture and Agri-Food Canada), SaskEnergy, TD Friends of the Environment Foundation, Farm Credit Canada, Canadian Grain Commission, Canadian Wheat Board, Home Building Centre, Monsanto*

Herbs and spices suitable for production in the Parkland region: arnica, valerian, mugwort, lovage, Turkish rhubarb, Echinacea angustifolia, feverfew, yarrow, catnip, lavender, comfrey, Siberian motherwort, marshmallow, stinging nettle, St. John's wort, spearmint, burdock, summer sage, sheep sorrel, Seneca, peppermint. *Cooperator: Prince Albert District 32 ADD Board*

Equipment challenges: This is the first year we used the chemical injection kit on the sprayer. One "kink" was identified when the peas showed stunted growth after spraying. We found there was no flow control valve between the two smaller holding tanks (one with Odyssey, one with Lontrel) and the water tank. There was a backwash of ~0.5 L (maximum) of Lontrel into the 400 gallons of water. That minute amount stunted the clopyralid-sensitive peas. A flow control valve has been installed.

Beans and peas: Navy beans (VM 416 and VM426), fababeans (Terboar, UM214), soybeans (Ustia, GG469), pinto beans and peas (CC901, Millenium, Madoc) were seeded. Emergence was poor and may partially be attributed to lack of moisture and heavy weed competition. The plots were not harvested. *Cooperator: Terramax*

Hybrid poplars (100) were planted in a demonstration of stool bed production. Only 12 cuttings established. Colder than acceptable temperatures during storage had a negative impact on survivability. *Cooperator: Saskatchewan Forestry Centre*

Annual forage variety demonstrations: Corn (HLS 014, HLS 007, HLSX 1002, HL 2017, HLS 009, HL 2093, HLR 229, HLSX 2092; Exsile; DKC27-12; CM 440; 39T71); Ranger barley; AC Pinnacle oats; Golden German foxtail millet; Crown millet; Mega Green sorghum sudangrass; 2663 InVigor canola; turnips (Typhon – hybrid, Marko - conventional). Due to heavy weed pressure and the lack of moisture, most varieties performed poorly. *Cooperators: NorthStar Seeds, Pickseed, Dekalb, Canamaize, Pioneer*

Swine manure and forages: 3000 gal/ac (70 lb N/ac) was injected into two of four replicated blocks of perennial forages. The impact was visually substantial. Vegetation in the treated plots was deeper green in colour and, while biomass production was not measured, production differences were evident when walking through the plots. *Cooperators: Prairie Agricultural Machinery Institute, Canadian Pork Council, Roger Begrand*

Wildlife and botanical surveys

- Development of a herbaceous cuttings collection (99 samples pressed to date)
- Provincial **Bertha Army Worm** survey and federal / provincial **weed** survey (162 fields)

Ongoing projects:

- **Dense nesting cover**
- Long-term evaluation of **potential varieties** for use as dense nesting cover
- **Native plant diversity**
- **Shelterbelts / woodlots**
- Maintenance of **wildlife corridor**
- **Fruit bearing shrubs** for wildlife

Training facility: Crop Insurance continues to use CLC facilities to train adjusters and other staff.

Other projects may have been cancelled, postponed, negatively affected by unforeseen conditions or for demonstration purposes only and have no results.

Saskatchewan Conservation Learning Centre Inc. is a registered charity and non-profit corporation located 18 km south of Prince Albert on Highway 2. Contact information: 800 Central Avenue, PO Box 3003, PRINCE ALBERT SK S6V 6G1. Phone: 306-953-2796 Fax: 306-956-2440 E-mail: sask.soil.conservation.assoc@sasktel.net

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PROJECT FUNDING

Canadian Adaptation and Rural Development Saskatchewan (Agriculture and Agri-Food Canada)
Saskatchewan Agriculture, Food and Rural Revitalization
PromoScience -- Natural Sciences and Engineering Research Council (Government of Canada)
Greenhouse Gas Mitigation Project for Canadian Agriculture
Centennial Student Employment Program (Saskatchewan Culture, Youth and Recreation)
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Special thanks to neighbours of the CLC

A partner in innovation in the Saskatchewan Agri-ARM network